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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/565,913

01/25/2006

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EXAMINER

FLANIGAN, ALLEN J

ART UNIT

PAPER NUMBER

3744

MAIL DATE

DELIVERY MODE

08/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/565,913

Applicant(s)

IGAMI, TAKAZI

Examiner

Allen J. Flanigan

Art Unit

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☒ Other: Translation of cited reference.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinnaga et al. (Kokai 2002-071286).

Please see the comments made in regard to the above rejection in the previous Office action.

Applicant's arguments filed 6/26/2007 have been fully considered but they are not persuasive.

Applicant's remarks consist entirely in referring to a declaration executed under rule 132 offering opinion evidence concerning the rejection of record.

First, it is noted that although the Declarant asserts to be the inventor of the applied reference, for the purposes of consistency the reference will continue to be referred to as "Shinnaga et al." as it is labeled in the English abstract.

Second, a machine translation of Shinnaga et al. has been obtained indicating that the slits 4 for the passage of brazing/soldering material ("wax") are to have a "predetermined spacing" along the longitudinal direction of the tube, indicating that the reference recognizes that at least one of the claimed parameters (the distance between neighboring slits) is a result-effective variable.

Declarations offering opinion evidence are covered in MPEP 716.01(c).

A declaration from the alleged inventor of an applied reference, offering opinion as to matters concerning the teachings and suggestions such reference might offer to those skilled in the art, would *prima facie* appear to be rather compelling. Had such a declaration been given by an inventor of a patent owned by a competing company, or other person who was independent of the current applicant and assignee of the claimed invention, a fair amount of weight might be given to such a person's opinions and conclusions. It is noted, however, that in the instant application Declarant Shuko is employed by the assignee of the present application, and thus a potential conflict of interest may be noted.

Declarant Shuko's opinion as to the ultimate question of the obviousness of the claimed invention (middle of the second page) is entitled to no weight. As for the opinion expressed that "there is no description or suggestion" regarding optimum slit length and spacing "in the specification of the cited application", this would seem to be contradicted (in part, at any rate) by the disclosure noted above regarding the teaching of a "predetermined spacing" for the slits being desirable.

Finally, Declarant's assertion that the "present invention was completed by [conducting] various experiments" testing the effect of different lengths and slit layouts would seem to confirm the Examiner's conclusion that the claimed invention involves no more than routine optimization to achieve an appropriate balance between good flow of solder/braze through the slits and structural

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strength of the tube structure. Such routine experimentation to determine optimum dimensions and ratios, absent a showing of critical, unexpected results, is merely the work of one ordinarily skilled in the art. See *In re Aller*, **105 U.S.P.Q. 237**.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen J. Flanigan whose telephone number is (571) 272-4910. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax

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phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Allen J. Flanigan
Primary Examiner
Art Unit 3744

AJF

A handwritten signature in black ink, reading "Allen J. Flanigan". The signature is written in a cursive, flowing style with a large, stylized initial "A".

Translation of Shinaga et al

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the approach bend crosswise the bar by which the clad of the wax material was carried out to the front face, and the cross section manufactures flat abbreviation theta-like tube for heat exchangers, and its flat tube.

[0002]

[Description of the Prior Art] While bending the bar with which wax material was covered by the front face, the flat tube for heat exchangers with which a protruding line bends in the inner surface of the center of a longitudinal direction of the cross section, and the cross section is formed in the shape of abbreviation theta is proposed. The protruding line can consider the case where the ups-and-downs section is formed in the longitudinal direction center section of the bar by return, and the case where started the crosswise ends edge of a bar in the shape of L character, and it is piled up. Many were used, when wax material was covered on the core material front face of aluminum and the flat tube made from aluminum was manufactured.

[0003]

[Problem(s) to be Solved by the Invention] Since soldering immobilization of the fin is usually carried out at the outside surface side when manufacturing the flat tube for heat exchangers made from aluminum, wax material is covered there. And sacrificial anode material is covered as anticorrosive material at the inner surface side in many cases. In such a case, if a protruding line is bent by return in the center of a tube cross section, soldering with the crowning and tube inner surface cannot be performed. This is because wax material is covered only at the outside surface side of a tube, so a means to solder the inner surface sides does not exist.

[0004] In addition, when the both ends of a bar are bent in the shape of a cross section of L characters, and comparing both edges, forming a protruding line and contacting the point of the protruding line to the inner surface of a tube, wax material is located on the boundary of both edges, and it infiltrates into a tubing inner surface and may be able to solder the crowning and tubing inner surface of a protruding line. However, it is not easy to bend crosswise both the edges of a bar in the shape of a cross section of L characters in accuracy, and for the apical surface to contact a tube inner surface to accuracy. Then, this invention makes it a technical problem to offer the flat tube manufactured by the manufacture approach of the flat tube which can solder certainly the crowning of the protruding line, and the inner surface of a tube, and its approach while it forms the ups-and-downs section in the inner surface of the center of a longitudinal direction of a cross section by return and forms a protruding line.

[0005]

[Means for Solving the Problem] While a bar bends crosswise and is formed in the shape of [flat] tubing, this invention according to claim 1 It is a protruding line (1) to the inner surface of the center of a longitudinal direction of the cross section. In the flat tube for heat exchangers with which it bent and the cross section was formed in the shape of abbreviation theta said bar one front face -- wax material (2) it covers -- having -- the wax material (2) it bends so that it may appear in the outside surface side of a flat tube -- having -- said protruding line (1) While consisting of what bent a part of bar by return, it

is the crowning (3). It comes to contact the inner surface which counters. the crosswise both ends of said bar pile up mutually -- having -- said crowning (3) It is a slit for wax material induction (4) at predetermined spacing to the longitudinal direction. Or it comes to form a break in an outside surface side from an inner surface side. said wax material by the side of the outside surface of a flat tube (2) melting is carried out -- having -- it -- said slit (4) or a break -- minding -- said crowning (3) It permeates between said inner surfaces. Subsequently, cooling solidification is carried out and it is said crowning (3). It is the flat tube for heat exchangers with which it comes to solder between said inner surfaces.

[0006] While a bar bends crosswise and is formed in the shape of [flat] tubing, this invention according to claim 2 It is a protruding line (1) to the inner surface of the center of a longitudinal direction of the cross section. In the flat tube for heat exchangers with which it bent and the cross section was formed in the shape of abbreviation theta said bar one front face -- wax material (2) it covers -- having -- the wax material (2) it bends so that it may appear in the outside surface side of a flat tube -- having -- said protruding line (1) While consisting of what bent a part of bar by return, it is the crowning (3). It comes to contact the inner surface which counters and is said crowning (3). While crosswise both the edges of a bar put on a duplex Edge by the side of the top contact (5) It estranges at spacing suitably in the direction of a protruding line. The slit (6) or break for wax material induction It is formed in an outside surface side from the inner surface side, and is said wax material by the side of the outside surface of a flat tube (2). Melting is carried out. it -- said slit (6) or a break -- minding -- said crowning (3) it permeates between said inner surfaces and, subsequently cooling solidification is carried out -- having -- said crowning (3) It is the flat tube for heat exchangers with which it comes to solder between said inner surfaces.

[0007] It sets to claim 2 and this invention according to claim 3 is a slit for each wax material induction (6). Or a break is the flat tube for heat exchangers which it comes to form crosswise [of a bar]. Setting this invention according to claim 4 to either claim 1 - claim 3, said bar is wax material (2) to the front face of one of these. While being covered, it is anticorrosive material (7) to the front face of another side. It is the covered flat tube for heat exchangers.

[0008] While a bar bends crosswise and is formed in the shape of [flat] tubing, this invention according to claim 5 It is a protruding line (1) to the inner surface of the center of a longitudinal direction of the cross section. In the approach of manufacturing the flat tube for heat exchangers with which it bent and the cross section was formed in the shape of abbreviation theta It is wax material (2) only to one front face. The covered bar is prepared. In the mid-position of the cross direction of the bar It is a slit for wax material induction (4) intermittently to the longitudinal direction. With the process which forms a break, or subsequently said wax material (2) it appears in the outside surface side of a tube -- as -- the bar -- ups-and-downs formation -- carrying out -- said slit (4) or the break was used as the crowning (3) -- turning up -- the section -- said protruding line (1) While being formed The crowning (3) With the process formed so that crosswise both the edges of a bar may pile up mutually in contact with a tube inner surface, subsequently said wax material by the side of the tube outside surface (2) fusing -- it -- said slit (4) or a break -- minding -- said crowning (3) It is made to permeate between said inner surfaces. Subsequently, cooling solidification is carried out and it is said crowning (3). It is the

manufacture approach of the flat tube for heat exchangers of providing the process which makes between said inner surfaces soldering.

[0009] While a bar bends crosswise and is formed in the shape of [flat] tubing, this invention according to claim 6 It is a protruding line (1) to the inner surface of the center of a longitudinal direction of the cross section. In the approach of manufacturing the flat tube for heat exchangers with which it bent and the cross section was formed in the shape of abbreviation theta It is wax material (2) only to one front face. The covered bar is prepared, it estranges at one edge of the cross direction at the longitudinal direction, and they are many slits (6). With the process which forms a break, or subsequently The wax material (2) Ups-and-downs formation of the bar is carried out crosswise so that it may appear in the outside surface side of a flat tube, and it is said protruding line (1) at the clinch section of the pars intermedia of a bar. While constituting The crowning (3) While crosswise both the edges of a bar put on a duplex in contact with a tube inner surface Edge by the side of the repeated top contact (5) Said slit for said wax material induction (6) With the located process, a break or subsequently said wax material by the side of the outside surface of a flat tube (2) fusing -- it -- said slit (6) or a break -- minding -- said crowning (3) Make it permeate between said inner surfaces, and, subsequently cooling solidification is carried out. Said crowning (3) It is the manufacture approach of the flat tube for heat exchangers of providing the process which solders between said inner surfaces.

[0010]

[Embodiment of the Invention] Next, based on a drawing, it explains per gestalt of operation of this invention. The flat tube for heat exchangers of this invention is a fracture perspective view a part, and drawing 1 shows the condition before soldering. Moreover, the 1st process of a bar for drawing 2 to manufacture this flat tube is shown, and drawing 3 shows the 2nd process. And the elements on larger scale in which drawing 4 shows the relation between the crowning 3 of a protruding line 1 and the superposition section 8, and drawing 5 are the enlarged drawings showing the condition after the soldering. This flat tube forms a protruding line 1 in the inner surface of the center of a longitudinal direction of that cross section by ups and downs by return, and contacts that crowning 3 in the superposition section 8 of the ends of a bar while it bends a bar crosswise and forms it in the shape of [flat] tubing, as shown in drawing 1 .

[0011] As the wax material 2 is covered by only one front face of the core material 9 of aluminum and this bar is shown in drawing 4 and drawing 5 on the surface of others, that with which the anticorrosive material 7 as a sacrificial anode layer was covered is used. And it bends so that the wax material 2 may be located in the outside surface of a tube, and both the edge piles up. The slit 4 or the break is intermittently formed in the crowning 3 of a protruding line 1. Slit 4 part of the crowning 3 carries out opening of such a slit 4 more widely by forming in the condition of a bar, as shown in drawing 2 , and subsequently bending a protruding line 1 by return like drawing 3 .

[0012] And after forming like drawing 1 , the fin which is not illustrated to the outside surface side is located, a heat exchanger core is assembled, the whole is inserted into a hot furnace, and melting of the wax material 2 is carried out. Then, the wax material 2 located in the clinch of a protruding line 1 permeates between a crowning 3 and a tube inner surface through a slit 4 by capillarity. Subsequently, soldering immobilization of each part which contacts mutually as shown in drawing 5 is carried out in one by carrying

out cooling solidification of the whole. In addition, although both the edges of a bar put on the crowning 3 of a protruding line 1 in this example, it may replace with it and that superposition section 8 may be located in one edge of the cross direction of a flat tube like drawing 8.

[0013] Next, drawing 6 shows the gestalt of operation of the 2nd of this invention, and instead of forming a slit in the crowning 3 of a protruding line 1, this example forms many slits 6 in one edge 5 of a bar crosswise, and it is bent so that that slit 6 may be located in the crowning 3 of a protruding line 1. Also in this case, what is necessary is to form the slit 6 or the break in one edge 5 of a bar beforehand, to bend it with foaming equipment subsequently and just to form like drawing 6. in addition, drawing 6 -- the condition before soldering of a flat tube -- being shown -- drawing 7 -- the condition after the soldering of the is shown. That is, when the flat tube bent as shown in drawing 6 is inserted into a hot furnace and melting of the wax material 2 is carried out, the wax material 2 by the side of a tube outside surface infiltrates into an inner surface side through a slit 6, and it is located between the crowning 3 of a protruding line 1, and a tube inner surface. In addition, since it is formed crosswise [of a bar], a slit 6 is the crowning (3) of a protruding line 1. To some extent, even if it carries out a location gap, the wax material 2 can be supplied crosswise certainly at the crowning 3 of a protruding line 1.

[0014]

[Function and Effect of the Invention] In that in which according to the flat tube for heat exchangers and its manufacture approach of this invention the protruding line 1 was bent in the inner surface of the center of a longitudinal direction of a cross section, and the cross section was formed in the shape of abbreviation theta In spite of that with which the wax material 2 was covered only at the outside surface side of the tube The wax material by the side of the outside surface of a tube permeates between a crowning 3 and the inner surface of a tube through the slit 4 or break formed in the crowning 3 of a protruding line 1, and a protruding line 1 is joined by the inner surface of a tube by subsequently carrying out cooling solidification of it. Thereby, while the reinforcement of a tube is highly maintainable, it becomes possible to cover anticorrosive material etc. to the inner surface side of a tube.